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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,237	12/10/2003	Hiroaki Ono	246391US6	4868
22850 7590 05/22/2007 OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER HUNG, YUBIN	
			ART UNIT 2624	PAPER NUMBER
			NOTIFICATION DATE 05/22/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	Application No. 10/731,237	Applicant(s) ONO ET AL.	
	Examiner Yubin Hung	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/12/06</u> . | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 101*

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

In addition, the USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), ANNEX IV, partly reads as follows:

First paragraph

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structure and computer programs which impart functionality when employed as a computer component. ...

Second paragraph

Both types of "descriptive material" are nonstatutory when claimed as descriptive material per se. ...

Section (a), second paragraph, beginning at line 7

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowery, 32 F.3d at 1583-84, 32 USPQ2d at 1035. ...

2. Claims 12 and 13 are rejected under 35 U.S.C. 101 because the claimed inventions are directed to non-statutory subject matter as follows. Claim 12 recites a *recording medium* storing and claim 13 recites a *program*. As recited above, a computer program (let alone a *program*, which is not necessarily a computer program)

*per se* is nonstatutory and additionally, a recording medium is not necessarily a computer-readable medium; therefore the inventions of claims 12 and 13 are not statutory subject matter.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 4, 6 and 7 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Specifically, claim 4, and similarly claims 6 and 7, recites using the average of each of the color component (i.e., the averages of all three color components are used) in the interpolation of a color component (e.g., red) that is not the first (e.g., green). However, in the specification, for each non-first color component (the first component being green) to be interpolated, only the average of that color is used; see the last two lines of page 53 (for interpolating red) and the third paragraph of page 54 (for blue) of the instance application.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 2 and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakarala et al. (US 7,088,392), and further in view of Lin et al. (US 6,069,973).

7. Regarding claim 1, Kakarala discloses an image processing apparatus [Fig. 1] that generates a plurality of color components [Fig. 1, ref. 35] on the basis of a color- and-sensitivity mosaic image [Fig. 1, ref. 25], comprising

- extraction means for extracting a predetermined area centered on a pixel of interest, which is an object to be processed, from the color- and-sensitivity mosaic image [Refs. 40 (extraction means) of Fig. 1 and Fig. 2; Fig. 2, ref. 42; Col. 5, lines 1-10; Col. 8, lines 53-65. Note that the predetermined area is 3x3. Note further that all functions corresponding to the limitations of this claim are performed in the DSP; therefore the DSP is considered the means for performing each of the respective functions]
- edge detection means for detecting an edge (*of the local area information*) on the basis of, (*of the pixels included in the local area information,*) pixels having a first color component [Fig. 4, ref. 100b (edge detection for G, the first color); Col. 8, lines 20-52. Note that the gradient of G indicates the direction and

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strength of a potential edge point. Note that Lin teaches the limitations regarding "local area information;" see below]

- first interpolation means for interpolating the first color component associated with the pixel of interest by computing a weighted average using, *(of the pixels included in the local area information,)* the pixels having the first color component on the basis of the direction of the edge detected by the edge detection means  
[Fig. 1, ref. 40 (first interpolation means); Fig. 2, ref. 42 (interpolating the first color component); Fig. 4, ref. 100b-170 (weighted average 160 & 170 on the basis of edge direction 100b-115, as indicated by the G gradient); Fig. 5; Col. 9, line 51-Col. 10, line 10 (Eq. 13) and Col. 13, line 65-Col. 14, line 33 (Eq. 17 or 18). Note that pixels with color G are used in the weighted average]
- statistic-information computing means for computing statistic information on the basis of the pixels included in the local area information  
[Fig. 1, ref. 40 (statistic-information computing means); Fig. 8, ref. 800 (the sum of absolute values is a piece of statistic information); Col. 16, lines 56-60]
- second interpolation means for interpolating a color component other than the first color component associated with the pixel of interest on the basis of the first color component associated with the pixel of interest, which is interpolated by the first interpolation means, and the statistic information  
[Fig. 1, ref. 40 (second interpolation means); Fig. 2 (interpolating R and B using interpolated G, the first color component); Fig. 8 and Col. 16, lines 53-56 (also using statistic information as part of the second interpolation)]

Kakarala does not expressly disclose the following, which is taught by Lin

- generation means for making uniform the sensitivity characteristics relative to the optical intensity of pixels *(included in the predetermined area extracted by the extraction means)* and generating local area information including the pixels, each pixel having one of the plurality of color components and the uniform sensitivity characteristic relative to the optical intensity  
[Lin: Fig. 2, ref. 2 (generation means); Fig. 2, refs. 4 & 6-R, G, B (each pixel having one of R, G or B color); Figs. 3 & 4 (making uniform sensitivity characteristic); Col. 4, lines 28-50; Col. 4, line 65-Col. 5, line 32 (see Col. 5, line 33-Col. 7, line 46. Note that with the correction using the correction factors the pixels will have uniform sensitivity characteristics. In addition, the pixels along with the corrected colors are (part of) local area information. (Note further that the extraction of local area is disclosed by Kakarala as discussed above)]

Kakarala and Lin are combinable because they both have aspects that are from the same field of endeavor of color processing.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Kakarala with the teaching of Lin as recited above. The motivation would have been to compensate for the difference in the signals output from the imaging elements so that an accurate representation of the image can be obtained, as Lin indicates in Col. 4, lines 56-64.

Therefore it would have been obvious to combine Lin with Kakarala to obtain the invention as specified in claim 1.

8. Regarding claim 2, note that the correction of Lin [Fig. 3] applies to all pixels, including the defective ones.

9. Claim 11 is similarly analyzed and rejected as per the analysis of claim 1 since the combined invention of Kakarala and Lin teaches an apparatus that effects the method recited in claim 11.

10. Claims 12 and 13 are rejected since Kakarala further discloses a computer-readable medium [Fig. 1, ref. 50] and implementing the method in software [Col. 4, lines 53-56].

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11. Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakarala et al. (US 7,088,392) and Lin et al. (US 6,069,973) as applied to claims 1, 2 and 11-13 above, and further in view of Tsuruoka (US 6,721,003).

Regarding claim 3, the combined invention of Kakarala and Lin discloses all limitations of its parent, claim 1.

In addition, Tsuruoka discloses computing at least one of the average of each color component, standard deviation of each color component, and a correlation coefficient between the first color component and the other color component on the basis of the pixels included in the local area information [Fig. 1, ref. 113; Fig. 7, refs. S7 & S8; Col. 9, lines 61-Col. 10, line 5; Col. 10, lines 30-36]

The combined invention of Kakarala and Lin is combinable with Tsuruoka because they both have aspects that are from the same field of endeavor of color processing.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify the combined invention of Kakarala and Lin with the teaching of Tsuruoka and choose green as the first color component. The motivation would have been to provide information to reconstruct missing colors, as Tsuruoka indicates in Col. 10, lines 37-38.



Therefore it would have been obvious to combine Tsuruoka with Kakarala and Lin to obtain the invention as specified in claim 3.

Regarding claim 5, Tsuruoka further discloses

- wherein the second interpolation means interpolates the color component other than the first color component associated with the pixel of interest on the basis of the first color component associated with the pixel of interest, which is interpolated by the first interpolation means, and the average of the color component other than the first color component, which is computed by the statistic-information computing means  
[Fig. 7, refs. S7-S9; Col. 9, lines 61-Col. 10 and Col. 37-38. Note that Kakarala discloses using interpolated first color (green) in the interpolation of the other color components, per the analysis of claim 1]

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12. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kakarala et al. (US 7,088,392) and Lin et al. (US 6,069,973) as applied to claims 1, 2 and 11-13 above, and further in view of Skow (US 7,102,669) and Hirano et al. (US 6,144,412).

Regarding claim 8, the combined invention of Kakarala and Lin discloses all limitations of its parent, claim 1.

In addition, Skow discloses applying gamma conversion before interpolation [Fig. 1, refs. 115 & 120; Col. 7, lines 10-17] and Hirano discloses applying inverse gamma conversion after interpolation [Fig. 7, ref. 77 and Col. 15, lines 25-33]

The combined invention of Kakarala and Lin is combinable with Skow and Hirano because they all have aspects that are from the same field of endeavor of color processing.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify the combined invention of Kakarala and Lin with the teaching of Skow and Hirano as recited above. The motivation would have been to increase a perceived dynamic range, as indicated by Skow in Col. 7, lines 10-11, as well as to make the color signals suitable for a display with a linear characteristic, as Hirano indicates in Col. 15, lines 25-27.

Therefore it would have been obvious to combine Skow and Hirano with Kakarala and Lin to obtain the invention as specified in claim 8.

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13. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakarala et al. (US 7,088,392) and Lin et al. (US 6,069,973) as applied to claims 1, 2 and 11-13 above, and further in view of Neter (US 7,133,073).

Regarding claim 9, the combined invention of Kakarala and Lin discloses all limitations of its parent, claim 1.

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The combined invention of Kakarala and Lin does not expressly disclose the following, which is taught by Neter

- wherein the first color component is a color component that statistically has the highest signal level of the plurality of color components  
[Fig. 3; Col. 8, lines 32-35]

The combined invention of Kakarala and Lin is combinable with Neter because they both have aspects that are from the same field of endeavor of color processing.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify the combined invention of Kakarala and Lin with the teaching of Neter and choose green as the first color component. The motivation would have been because human eyes perceive intensity edge better than color edges, as Lin indicates in Col. 8, lines 32-33 and Kakarala uses green gradients (edges) to interpolate green component first, per the analysis of claim 1 above.

Therefore it would have been obvious to combine Neter with Kakarala and Lin to obtain the invention as specified in claim 9.

14. Regarding claim 10, Neter further discloses

- wherein the first color component is a color component that occupies the largest portion of the color mosaic image of the plurality of color components  
[Fig. 3; Col. 8, lines 21-26. Note that green is the first color component]

***Allowable Subject Matter***

15. The following is a statement of reasons for the indication of allowable subject matter:

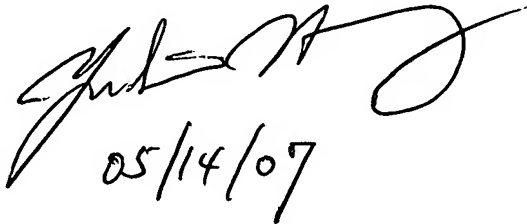
- A. Regarding claim 4, and similarly claims 6 and 7, prior art of record, alone or in combination, does not disclose, teach or suggest interpolating a color using its average, standard deviation, correlation with another color and the interpolated value of that other color.

***Contact Information***

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (571) 272-7451. The examiner can normally be reached on 7:30 - 4:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew C. Bella can be reached on (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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17. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



05/14/07

Yubin Hung  
Patent Examiner  
Art Unit 2624  
May 14, 2007